

for a like period of about thirty years, and down to the present time they have remained absolutely at rest so far as one can tell from full and careful sets of measures by the best double star observers. So far as I know, there is no other instance of this kind known in the heavens. There is no lack of examples of double stars where the motion as shown by the various measures is apparently peculiar, and possibly inconsistent with the theory of the mutual attraction of the observed bodies; and various speculations have been advanced to explain the so-called irregular variable motions. A dark or invisible star is usually interposed to account for the observed movements. With all the latitude afforded by the unavoidable errors of observation, which very often appear to assume a systematic form, it is not difficult in any instance to suggest an undiscovered disturbing body which, according to the terms of the proposed hypothesis, shall appear to more or less perfectly account for the observations, but in most instances the disturbing body is more likely to be finally discovered at the smaller end of the telescope than elsewhere.

With respect to this star, I have only to add that it seems to furnish an example, perhaps the only one, of so peculiar motion that the explanation is not readily suggested by the observations themselves. The steady change in the position of the smaller star for about forty years, and the subsequent arrest of its motion, which has continued down to the present time, are both apparently established by unimpeachable observations by the best observers. Of course any attempted explanation at this time would be premature, at the best only speculation, and would have no value, and presumably no interest. The usual dark body will readily suggest itself, and it is easy to imagine one of these stars having an invisible companion, the two moving in a very eccentric orbit, the plane of which is nearly in the line of sight, and to select a period and direction of motion for the hypothetical pair such as will explain approximately not only the motion, but the absence of motion, shown by the observations of the invisible components; and when this is presented with the usual refinements of computation, doubtless for the time being a plausible case could be made out. When the relative motion has been resumed, and a decided change has taken place, there may be no difficulty in determining with substantial accuracy the general form of the orbit, and explaining the apparent anomalous relative movement of these stars, without assuming the existence of any third member of the system.

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*On a New Binary of Short Period in the Constellation Dorado*  
 $= H_2$  3683. By T. J. J. See, A.M., Ph.D. (Berlin).

While sweeping over some of the brighter stars in the constellation *Dorado*, January 14, I recognised the duplicity of a yellow star of the 6.5 magnitude; under a power of 520 the components were just well separated, and in brightness rated at

March 1897.

Short Period in Dorado.

399

7.8 and 8. This star has proved to be No. 1583 in the Catalogue of Lacaille, by whom it was first observed. In the *Argentine General Catalogue* it is numbered 5325, the companion 5326. The position of the principal star referred to 1900.0 is

$$\alpha = 4^{\text{h}} 38^{\text{m}} 39^{\text{s}}.3; \delta = -59^{\circ} 8' 32''.8.$$

While sweeping with the 20-foot reflector at the Cape of Good Hope, 1834 December 3, Sir John Herschel discovered that the star is a fine double. His observations of it are—

(1) *With the 20-foot Reflector.*

$t$	$\theta_0$	$\rho_0$
1834.920	260.8*	3 ± very fine.
1836.030	261.5*	3 ± very fine, but ill-defined.
1835.475	261.1	3 ± 2 <i>n</i> Herschel.

(2) *With the 7-inch Equatorial.*

$t$	$\theta_0$	$\rho_0$
1835.925	82.5	3.25
1836.884	80.0	4.20 glimmering, but perfectly steady.
1836.404	81.2	3.72 2 <i>n</i> Herschel.

The next determinations of the places of the two components are those made at Cordoba by Gould, who gives the following positions :—

		Mag. Mean Epoch.			$\alpha$	$\delta$	No. of Obs.
		$\begin{smallmatrix} \text{h} & \text{m} & \text{s} \end{smallmatrix}$				$\begin{smallmatrix} ^{\circ} & ' & '' \end{smallmatrix}$	
5325	Dorado	7	74 82	4 38	14.71	-59 11 24.5	6-6
5326	Dorado	7 $\frac{3}{4}$	73.94	4 38	14.99	-59 11 23.9	1-1 comes sq.
			74.99		15.11	23.5	5-5

Reduced to polar coordinates these differences in R.A. and Decl. give

$t$	$\theta_0$	$\rho_0$	
1874.38	74.4	2.23	1 <i>n</i>
1874.90	71.5	3.16	5 <i>n</i>

where the mean dates have been used.

If we assign to each result weight proportional to the number of nights we shall obtain

$t$	$\theta_0$	$\rho_0$	
1874.82	72.0	3.00	6 <i>n</i> Gould.

While the errors of positions depending on the Meridian Circle are not so small as those of good micrometer measures, there is no doubt that this place fairly represents the position of the companion at the epoch 1874.82.

\* These angles should be diminished by 180°.

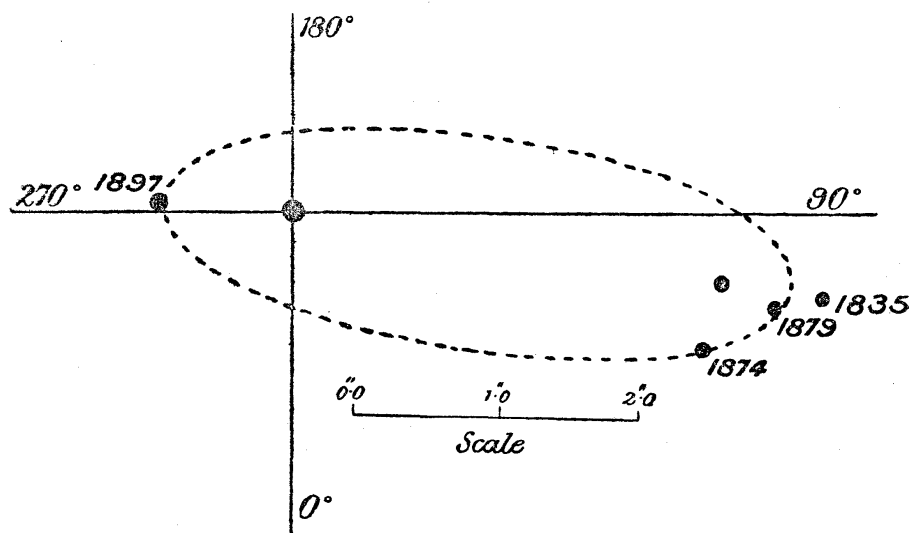
Apparently the only other previous measures of this system are those made by Russell and Hargrave at Sydney in 1879. Their settings of the micrometer gave

$t$	$\theta_0$	$\rho_0$	
1879.096	79.1	3.46	1 <i>n</i> Russell.
1879.096	80.6	3.32	1 <i>n</i> Hargrave.
1879.096	79.3	3.39	2 <i>n</i>

Our measures with the 24-inch Clark refractor are as follows :—\*

$t$	$\theta_0$	$\rho_0$	
1897.036	265.1	0.87	
1897.068	267.0	0.85	
1897.071	263.1	1.03	
1897.058	265.1	0.92	3 <i>n</i> See.
1897.068	257.7	—	
1897.071	261.3	1.0 $\pm$	
1897.070	259.5	1.0 $\pm$	2—1 <i>n</i> Cogshall.

On comparing this place with that given by Gould in 1874 we see that a great change has taken place in the last twenty-two years ; indeed, the change since 1879 has been almost as noticeable. It is now clear that when Russell made his measure eighteen years ago the companion was in almost exactly the same place observed by Herschel in 1835, and hence the period is



\* Difficult on account of low altitude.

approximately forty-four years. Since it is certain that we may rely on the general accuracy of Gould's place for 1874, it is evident that the motion is direct. From the present position of the companion it is clear that the previous observations relate to the apastron part of the apparent orbit. We may also infer that the eccentricity will lie between 0.6 and 0.7, and that the orbit is considerably inclined about a line of nodes near  $85^\circ$ . The observations do not suffice to fix the other elements, but we may conclude that the apparent orbit will not be very different from that indicated in the figure. The approximate period is obtained by comparing the observations of Herschel and Russell; the constant of areas by comparing the places of Gould and Russell; and hence it is possible to fix the area included between 1879 and 1897. Although the slope of the included arc cannot yet be determined, the approximate path here sketched will be useful to observers.

The rapid motion of this system, which has already carried the companion through one and a half revolutions, combined with the wide angular separation of the components and the high eccentricity of the orbit, renders it an object of extraordinary interest; and hence it merits the most careful attention of observers in the southern hemisphere.

*Lowell Observatory, City of Mexico:*  
1897 January 28.

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*Estimations of the Magnitude of Nova Aurigæ made at the Radcliffe Observatory, Oxford.* By E. J. Stone, M.A., F.R.S., Radcliffe Observer.

In the *Monthly Notices* for 1892 April estimations of the magnitude of *Nova Aurigæ* from 1892 February 3 to March 31 are given. In that interval the star was observed to change from mag. 4.4 to 14.0, the limit of visibility of the Radcliffe instrument. A chart is also given of the comparison stars with their adopted magnitudes.

Subsequent notes in the *Monthly Notices* for 1892 Nov., 1893 Jan., and 1895 Jan. reported that estimations had been made at intervals during 1892, 1893, and 1894; but on the nights, whose dates are there given, the star remained at about 9.7 on the adopted scale.

Since these printed reports examinations have been made on 1895 January 23, 30; September 26; December 7, when no change from 9.7 was detected.

But on 1897 March 10 another examination at once revealed a considerable diminution in brightness; and comparisons made independently by two observers, Mr. Robinson and Mr. McClellan, give the magnitude of the *Nova* as 11.3 on the scale previously adopted. Mr. McClellan also remarked that there